DOCUMENT RESUME

ED 471 632 CS 511 659

AUTHOR	Ashmore, Rhea A.; Farrier, Merle J.; Paulson, Lucy Hart; Chu, Xianhua
TITLE	The Effects of Phonemic Awareness Drills on Phonological Awareness and Word Reading Performance in a Later Learned Alphabetic Script.
SPONS AGENCY	Montana Univ., Missoula.
PUB DATE	2002-10-00
NOTE	30p.; Research was supported in part by funding from The University of Montana Foundation Excellence Fund.
PUB TYPE	Reports - Research (143)
EDRS PRICE	EDRS Price MF01/PC02 Plus Postage.
DESCRIPTORS	Foreign Countries; *Instructional Effectiveness; Primary Education; Reading Achievement; *Second Language Learning; *Word Recognition
IDENTIFIERS	China; *Phonemic Awareness; *Phonological Awareness

ABSTRACT

This study examined the effectiveness of phonemic awareness drills on phonological awareness and word reading performance in English of Mainland Chinese students in primary school. Employing a nonequivalent control group design, the research questions explored: (1) whether phonemic awareness drills promoted phonological awareness with the English language; and (2) whether phonemic awareness drills enhanced word reading was generalizable across gender or if the findings were specific to gender. Participants were 202 students in grades 1 and 2, 95 who were female, attending a private elementary school in Hangzhou, People's Republic of China. Over a period of 10 weeks, 101 students in the experimental group engaged in phoneme production/replication, phoneme isolation, phoneme segmentation and counting the sounds, phoneme blending, rhyming, phoneme deletion, and phoneme substitution with English sounds. Assessments were subtests of the Comprehensive Test of Phonological Processing (Elision, Blending Words, and Segmenting Words) and the Test of Word Reading Efficiency (Sight Word Efficiency). Analyses showed an important and consistent difference in words learned and phonological awareness gained by members of the experimental group, whether male or female. The findings strongly suggest explicit instruction in phonemic awareness promoted phonological awareness and word reading in English of Chinese primary school children. (Contains 52 references and 1 figure.) (Author/RS)

Reproductions supplied by EDRS are the best that can be made
from the original document.

Running head: EFFECTS OF PHONEMIC AWARENESS DRILLS

ED 471 632

The Effects of Phonemic Awareness Drills on Phonological Awareness and Word Reading Performance in a Later Learned Alphabetic Script

Rhea A. Ashmore, Merle J. Farrier, and Lucy Hart Paulson

The University of Montana-Missoula

Xianhua Chu

Zhejiang University, People's Republic of China

This research was supported in part by funding from The University of Montana Foundation Excellence Fund and the offices of George M. Dennison, President; Lois E. Muir, Provost and Vice President for Academic Affairs; and Lloyd T. Chesnut, Vice President of Research and Development, at The University of Montana-Missoula. We are grateful to Rick A. van den Pol, Director of the Division of Educational Research and Service, The University of Montana-Missoula, for his support and Ray Beck, Senior Vice President, Sopris West, for providing the intervention materials.

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

X Chu

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

CS 511 659

BEST COPY AVAILABLE

Abstract

This study examined the effectiveness of phonemic awareness drills on phonological awareness and word reading performance in English of Mainland Chinese students in primary school. Employing a nonequivalent control group design, the research questions explored: (a) whether phonemic awareness drills promoted phonological awareness with the English language; (b) whether phonemic awareness drills enhanced word reading in English; and (c) whether the treatment on phonological awareness and word reading was generalizable across gender or if the findings were specific to gender. Participants were 202 students in grades 1 and 2, 95 who were female, attending a private elementary school in Hangzhou, People's Republic of China. Over a period of 10 weeks, 101 students in the experimental group engaged in phoneme production/replication, phoneme isolation, phoneme segmentation and counting the sounds, phoneme blending, rhyming, phoneme deletion, and phoneme substitution with English sounds. Assessments were subtests of the Comprehensive Test of Phonological Processing (Elision, Blending Words, and Segmenting Words) and the Test of Word Reading Efficiency (Sight Word Efficiency). Analyses showed an important and consistent difference in words learned and phonological awareness gained by members of the experimental group, whether male or female. The findings strongly support explicit instruction in phonemic awareness promoted phonological awareness and word reading in English of Chinese primary school children.

The Effects of Phonemic Awareness Drills on Phonological Awareness and Word Reading Performance in a Later Learned Alphabetic Script

Phonemic awareness (PA) is the conscious ability to analyze spoken language into its component sounds (phonemes) and to perform mental operations on these smaller linguistic units (Liberman & Shankweiler, 1985; Wagner & Torgesen, 1987). It requires the ability to hear and manipulate distinct speech sounds apart from meaning or the representation of speech sounds in print. As stated by Sodoro, Allinder, and Rankin-Erickson (2002), "It is the awareness of sounds in *spoken* language separate from the representation of sounds by *written* language" (p. 223). PA is an aspect of phonological awareness, which is a more encompassing term referring to an awareness of larger spoken units such as syllables and rhyming words (Ehri, Nunes, Wilows, Schuster, Yaghoub-Zadeh, & Shanahan, 2001). Tasks such as tapping out the number of syllables in a word, rhyming words, telling the number of phonemes included in single words, identifying separate words in a spoken sentence, and deleting initial or final phonemes of a word demonstrate phonological awareness.

PA specifically refers to the "insight that every spoken word can be conceived as a sequence of phonemes" (Snow, C. E., Burns, M. S., & Griffith, P., 1998, p. 52). For example, *bat* is one word, but it is composed of three phonemes: */b/*, */a/*, and */t/*. PA is the knowledge that discrete speech sounds constitute words and that manipulating speech sounds can create new words (Greene, 1997). It is not the same as phonics (learning letter-sound correspondences) but can be considered a prerequisite to success in phonics instruction (Adams, 1990; Juel, 1988; National Reading Panel, 2000). Tasks involving

blending, deleting, substituting, or moving phonemes within or between words require PA or the ability to detect and manipulate individual sounds.

Phonological awareness is a strong predictor of reading acquisition (Blachman, 1984; Bradley & Bryant, 1985; Byrne & Fielding-Barnsley, 1991, 1993; Calfee, Lindamood, & Lindamood, 1973; Hatcher, Hulme, & Ellis, 1994; National Reading Panel, 2000; Scarborough, 1998). It has been documented in the research literature (Adams, 1990; Bradley & Bryant, 1983; Uhry, 1993, 1999) as an associate of beginning word reading in young children. Training studies (Ball & Blachman, 1991; Bradley & Bryant, 1983; Cunningham, 1990; Lundberg, Frost, & Petersen, 1988; Torgesen, Wagner, Rashotte, Alexander, & Conway, 1997; Uhry & Shepard, 1993) show an advantage in learning to read for children trained in phonological awareness in comparison with children without this training. Specifically, Lundberg *et al.*, (1988), Cunningham (1990), Ball and Blachman (1991), and Hatcher *et al.*, (1994) all demonstrated that comparison children exhibited greater improvement in reading performance than controls after explicit training on sound segmentation skills. Likewise, the National Reading Panel (2000) conducted a quantitative meta-analysis of 52 studies evaluating the effects of PA instruction on learning to read and spell. Findings revealed that teaching PA to children significantly improved their literacy development and essential foundational knowledge in the alphabetic system.

The correlation between phonological awareness and word reading has been widely researched. Many studies in this area are developmental in nature and emphasize both the predictive power and practical significance of phonological awareness. McDougall, Hulme, Ellis, and Monk (1994) found that English-speaking children's (aged

7 to 10 years) rime judgment and phoneme deletion abilities were positively correlated with their read-aloud performance, and that such a correlation was independent of the contribution from short-term memory. Leather and Henry (1994) and Gathercole, Willis, and Baddeley (1991) reported similar findings with younger children ranging in age from 4 to 7 years.

As the structure of the English writing system is alphabetic, PA contributes to children learning to read. Words have prescribed spellings that consist of letters symbolizing sounds in fairly predictable ways while spoken language has no breaks in signaling where one phoneme ends and the next one begins. The task of distinguishing the separate phonemes in word pronunciations so that they can be matched to letters is difficult. The discovery and identification of phonemic units are facilitated by explicit instruction in the structure of language (Ehri, Nunes, Wilows, Schuster, Yaghoub-Zadeh, & Shanahan, 2001). This is demonstrated by research revealing that people who have not learned to read and write have difficulty performing PA tasks (Morais, Bertelson, Cary, & Alegria, 1987), and people who have learned to read in a non-alphabetic script, such as Chinese, have difficulty segmenting speech into phonemes (Mann, 1987; Read, Zhang, Nie, & Ding, 1987). In addition to literacy acquisition in English, an understanding of the phonological constituents of words is an important determiner of reading success in many other alphabetic orthographies such as Spanish (Carrilo, 1994; Defior & Tudela, 1994), Portuguese (Cardoso-Martins 1995; Carraher, 1987; Cary & Verhaeghe, 1994), German (Wimmer & Hummer, 1990; Wimmer, Landerl, & Schneider, 1994), Turkish (Oktay & Aktan, 2002), Norwegian (Lundberg, 1991), Italian (Cossu, Shankweiler, Liberman, Katz, & Tola, 1988), and Greek (Aidinis & Nunes, 2001; Porpodas, 1989).

The idea that phonological awareness promotes reading in the alphabetic system has been extended to the non-alphabetic Chinese script. Chinese is a logographic writing system in which the smallest pronounceable unit is the character, and each character is associated with a syllable. Speech sounds are coded at the level of the syllable; individual phonemes are simply not represented in the script. Over 80% of Chinese characters are compounds containing a phonetic and a semantic component. The phonetic part provides information about the pronunciation. According to Tzeng (1981), this feature relies on a certain form of print-sound regularity and constitutes an example of phonological recoding, although it does not operate at the phonemic level as in the alphabetic system. The semantic component encodes the meaning. Furthermore, Chinese has a large number of words with the same pronunciation but a different meaning. What distinguishes these words is their tonal quality. Mandarin has four tones: high, rising, falling-rising, and falling. For example, the word *mai* with falling, or 4th tone, means "sell," and *mai* with falling-rising, or 3rd tone, means "buy." Every syllable is pronounced on one of these four tones, except when it is unstressed. Then, the tone distinctions disappear, and the unstressed syllable is pronounced light and short (McNaughton, 1979).

In Mainland China children learn to read logographic Chinese with the aid of Pinyin, "...a set of symbols used to transliterate Chinese characters and combine speech sounds of the common speech into syllables" (Beijing Languages Institute, 1989, p. 37). Pinyin uses the Latin alphabet, modified to meet the needs of the Chinese language. It is a shallow alphabetic orthography with a regular grapheme-phoneme correspondence, which differs from that of English in a number of ways. For example, the letter *q* need

not be followed by *u*, and the corresponding phoneme sounds like */ch/* as in the word *church*. Tone is marked with diacritics.

Liow and Poon (1998) examined the impact of phonological awareness in English and Chinese with 57 multilingual, grade 3 students whose language backgrounds were English, Chinese (Mandarin dialect), or Bahasa Indonesia (a member of the Malay language family common among ethnic Chinese Indonesian children). Assessments were a homophone decision task; an English spelling test comprised of regular words, irregular words, and non-words; and a Pinyin spelling test. All three groups of students were studying English and Chinese in the same school in Singapore. The Bahasa Indonesia group exhibited the highest levels of alphabetic phonological awareness, followed by the English group, and then the Chinese group. In Mandarin, the students' performance on the Pinyin spelling test suggested that tonal phonological awareness is relatively independent of alphabetic phonological awareness and this may affect children's strategies for the subsequent acquisition of a second written language.

Huang and Hanley (1977) investigated whether a child's phonological awareness and visual skills before instruction in school had any predictive power for later Chinese reading ability among 40 grade 1 students in Taiwan. The study also examined the extent to which phonological awareness and visual skills varied in three separate testing sessions during grade 1: before the children learned the alphabetic system Zhu-Yin-Fu-Hao (a system where each phoneme is represented by a distinctive visual symbol), immediately after the children learned Zhu-Yin-Fu-Hao, and at the end of the school year. The results showed that phonological awareness at the first testing session was significantly related to the ability to read Chinese characters at the end of the first year. However, the

predictive power of early phonological awareness decreased markedly when the effects of preschool reading scores were factored out. In addition, the 10 weeks of instruction in the alphabetic system led to an increase in performance on all tests of phonological awareness. This is consistent with the view that learning an alphabetic script improves phonological awareness ability.

Holm and Dodd (1996) investigated the effect of first-learned scripts on the acquisition ofEnglish literacy skills. Using a battery of tests, they looked at English segmentation and reading/spelling performance among four groups of undergraduates using different first-learned scripts. The Vietnamese and Australian undergraduates had adopted the alphabetic system early in their literacy development. The Mainland Chinese and the Hong Kong participants both used the logographic Chinese script, however, the former group had learned to read the characters with the help of Pinyin whereas the latter group had not. Although performance on real English words was equivalent, the Hong Kong participants performed poorly in English segmentation tasks compared to the other groups, even though they had the longest history of reading in English (averaging 15 years, compared to 10.4, 4.9, and 14.4 years for the Mainland Chinese, Vietnamese, and Australian subjects, respectively). The researchers concluded that the non-phonemic strategy developed in reading Chinese without Pinyin was so dominant that it applied to reading in the later-learned English script.

This study investigated the effectiveness of PA drills on phonological awareness and word reading performance in English of Mainland Chinese students in grades 1 and 2. The research questions explored: (a) whether PA drills promoted phonological awareness with the English language, given a tonal primary language; (b) whether PA

drills enhanced word reading in English, given an initial logographic writing system; and (c) whether the treatment on phonological awareness and word reading was generalizable across gender or if the findings were specific to gender.

Method

Sample

The sample was expected to consist of approximately 200 first and second grade Chinese children from four classrooms attending a school in Hangzhou, People's Republic of China (PRC). The sample was a convenience sample based upon availability and access to existing classrooms. The experimental and control groups were randomly chosen.

In the educational system of the PRC, nine years of compulsory education (grades 1-9) are required. Students are taught Chinese using Pinyin starting in grade 1, and English is introduced in grade 3. Children begin their schooling at six years of age, and students attend upper middle school or high school only if their test scores are acceptable. At the school site in the study, students were taught English in grades 1-6, 35 minutes per class, five classes per week. The English lessons consisted of listening and repeating words or story lines, saying and doing actions, and chanting or singing. Neither PA nor letter-sound correspondence in English was taught explicitly.

Procedure

Campbell and Stanley's (1963) nonequivalent control (comparison) group design structured this quasi-experimental study. A priori, an experimental difference of two additional correctly identified words would constitute an important finding while an alpha level of .05 was required for experimental data consistency. Inherent in the

nonequivalent control group design is the internal validity threat of selection. To control for the nonrandom assignment, an analysis of covariance (ANCOVA) was used in the statistical analysis.

Subtests of the Test of Word Reading Efficiency (TOWRE) (Torgesen, Wagner, & Rashotte, 1999) and the Comprehensive Test of Phonological Processing (CTOPP) (Wagner, Torgesen, & Rashotte, 1999) measured word reading and phonological awareness. The following describes these assessments.

Word reading. The Sight Word Efficiency (SWE) subtest of TOWRE assesses the number of printed real words in English that can be accurately identified within 45 seconds. The subtest has two alternate forms, Form A and Form B, listing 104 words each. Materials needed are a stopwatch, the profile/examiner record booklet, and the appropriate form of the Sight Word Efficiency Reading Card.

Phonological awareness. The Elision (EL), Blending Words (BW), and Segmenting Words (SW) subtests of the CTOPP were used to assess phonological awareness. All three subtests contain 20-items each. No materials, except for the profile/examiner record booklet, are required.

The EL subtest measures the extent to which an individual can say a word, and then say what is left after dropping out a designated sound. For the first two items, the examiner says a compound word and asks the student to say that word, and then say the word that remains after dropping one of the syllables. For the remaining 18 items, the student listens to a word and repeats that word, and then is asked to say the word without a specific sound. For example, the examinee is instructed, "Say *bold*." After repeating

"bold," the student is told, "Now say *bold* without saying */b/*." The correct response is "old." Testing stops when the examinee misses three consecutive items.

The BW subtest measures an individual's ability to combine sounds to form words. The examinee listens to a series of separate sounds and then is asked to put the separate sounds together to make a whole word. For example, the examinee is asked, "What word do these sounds make: t-oi?" The correct response is the word "toy." Testing stops when the examinee misses three consecutive items.

The SW subtest measures the ability to say the separate phonemes that make up a word. The examinee is told to repeat a word, then to say it one sound at a time. For example, the examiner tells the examinee to say "beast" and then to say it one sound at a time. The correct response is "b-e-s-t." Testing stops when the examinee misses three consecutive items.

Training Phase

Participants were trained over a period of 10 weeks, during which five 10-minute PA sessions were conducted every week, totaling 50 sessions (500 total minutes) for the experimental group. Training took place during English class where class size approximated 50 students, and individuals recited as a whole or were called upon singly.

With the cooperation of the school administration, two English teachers in the school were responsible for the training: Teacher A taught the experimental group in grade 1 and the control group in grade 2; Teacher B taught the control group in grade 1 and the experimental group in grade 2. The investigator met weekly with the teachers to review the week's drills and to ensure their adherence to the training protocols. The teachers were aware of the purpose of the study.

Sounds and Letters for Readers and Spellers (Greene, 1997) was the resource used for the PA instruction. The text contains 18-units of scripted PA drills, each unit consisting of nine stages or activities: 1. phoneme production/replication, 2. phoneme isolation, 3. phoneme segmentation and counting the sounds, 4. phoneme blending, 5. rhyming, 6. phoneme deletion, 7. phoneme substitution, 8. phoneme reversal, and 9. Pig Latin recitation. For the purposes of this study, the teachers presented two units per week, encompassing stages 1-7. The following describes these seven stages:

Stage 1 Phoneme production/replication. The teacher says a phoneme and the students repeat the sound. Example: "Say */m/*." The response is *"/m/."*

Stage 2 Phoneme isolation. The teacher says a word containing two to four phonemes; she then instructs the students to isolate a certain phoneme. Example: "Say *mat*." (Response: "*mat*.") "Say the first sound in *mat*." (Response: "*/m/*.")

Stage 3 Phoneme segmentation. The teacher says a word containing more than one phoneme; she then instructs the students to say the sounds in the word. Example: "Say *dad*." (Response: "*dad*.") "Say the sounds in *dad*." (Response: *"/d/ /a/ /d/."*)

Stage 4 Phoneme blending. The teacher says several phonemes. The students repeat what the teacher says until the word in pronounced. Example: "Listen and repeat: */a/ /m/, /a/ /m/, am*. (Response: "*/a/ /m/, /a/ /m/, am*.")

Stage 5 Rhyming. The teacher says a word. The students respond with a word that rhymes. Example: "Say a word that rhymes with *mat*." (Response: "hat," "bat.")

Stage 6 Phoneme deletion. The teacher says a word containing more than one phoneme; she instructs the students to delete a phoneme and say the remaining sound(s). Example: "Say *cat*. Say *cat* without the */t/*." Response: "*/ka/*."

Stage 7 Phoneme substitution. The teacher says a word containing more than one phoneme; she instructs the students to change one of the sounds to another sound and say the new word. Example: "Say *bat*. Now change the last sound in *bat* to */m/*. " Response: "*/bam/*."

After 10 weeks of instruction, all groups were post-tested using the Sight Word Efficiency subtest of the TOWRE and the Elision, Blending Words, and Segmenting Words subtests of the CTOPP.

Results

Initial Considerations

At the initiation of the study, the researchers obtained permission to conduct the study from both the American university and the Chinese authorities. Then they consulted with the administrators and teachers at the school site in Hangzhou, PRC. At the request of the principal, two English teachers in the school were responsible for the training: Teacher A taught the experimental group in grade 1 (n = 50) and the control group in grade 2 (n = 51); Teacher B taught the control group in grade 1 (n = 50) and the experimental group in grade 2 (n = 51). Both teachers were 25-year-old females with similar training who started teaching English at the school in 1998.

Participants

Participants were all first grade (n = 100) and all second grade (n = 102) Chinese children from four classrooms attending the school. Of the 202 children in the sample, 95 (47%) were females, and 107 (53%) were males. At the first testing session, the students ranged in age from 74 to 109 months, with a mean age of 91 months with a standard

deviation of 8 months. In the judgment of the children's two teachers, none of the students had perceptual or neurological problems, and none were mentally deficient.

The school was a private, boarding, elementary school (grades 1-6) located in Hangzhou, the capital city of approximately 1.69 million people, in Zhejiang Province. Total enrollment approximated 600 students. Based on test scores, the administration admitted 102 new students in 2001. The children came from middle to upper middle class families who lived in this province, except for one boy in grade 2 who lived in Hong Kong. The language spoken in school was Putonghua (Mandarin); however, at home the children spoke dialects dependent on the region of their residence. For example, a child from Wenzhou, a city in southeastern Zhejiang Province, pronounced words quite differently from a child who lived in Hangzhou.

The pre-testing took place in February 2002 during the first week of the second semester of the school year. After 10 weeks instruction in phonemic awareness drills, the children were post-tested. During each testing session, the children were assessed individually in a quiet room in the school by one of the researchers or by one of the three trained educators. Total testing time per session was about 15 minutes. Measures of word reading and phonological awareness were administered to all participants.

Reporting Conventions

The findings are reported with values rounded to the nearest integer, the same level of precision of the data collected. The posttest scores reported are the adjusted scores as determined by ANCOVA procedures. It is noted that the posttest scores were only slightly adjusted by the procedure, usually in the order of plus/minus .02 words to plus/minus .2 words per group. This low level of adjustment indicates the groups

generally began the research at very nearly the same level of achievement thus providing the effect of random assignment.

Statistical Findings

Word reading. The Sight Word Efficiency subtest calculated an initial identification of five words for both the control and experimental group. After the 10 weeks of intervention, the control group scored eight words while the experimental group scored 10 words. This provided the control group with a gain in recognition of three additional words, and the experimental group having gained five additional words over their pretest scores. The experimental group gain of two words per student has a consistency reflected in the p-value of 0.0004.

Phonological awareness. The Elision (EL), Blending Words (BW), and Segmenting Words (SW) subtests provided a measure of phonological awareness. The EL scores were again identical, to the nearest word, for both the control and experimental groups, each scoring five points on the pretest. The posttest scores found an experimental difference of two words with the experimental group outscoring the control group by two words per student with a p-valued calculated at 0.0001.

The BW subtest resulted in a larger experimental difference with the experimental group outscoring the control group by four words per group member. This difference is supported by a p-value of 0.0001.

The SW subtest had the highest experimental difference, five words per group member, with the experimental group outscoring the control group. The five words per student gained by the experimental group are supported by a p-value of 0.0001.

These results are evident when plotted against each other (see Figure 1).

[insert Figure 1 here]

Male/Female Differences

There were no differences in scores between females and males, either in the pretest scores or the adjusted posttest scores over all or when contrasted by control and experimental groups. There were also no differences in gain scores between females and males in the control group and their counterparts in the experimental group.

These findings may also be expressed by calculating a Pearson r correlation on the posttest scores. The experimental group scores correlate well among subtests having r-values that range from .40 to .59. The control group correlations are not as strong or consistent, having r-values ranging from .21 to .62. All correlations met the required p-value of .05 or less.

Discussion

Initial Hypothesis

This research considered a priori that an important experimental difference would be established by a finding in which the experimental group's average gain exceeded the control group's average gain by at least two words and sufficient experimental consistency of the data would be established at an alpha level of .05. These experimental requirements were met on all measurements; i.e., each of the subtest scores indicated an important and consistent difference in English word reading and phonological awareness gained by the members of the experimental group that were provided with the intervention. These findings not only support the contention that the PA drills serve to improve Chinese primary students' English literacy achievement, but the intervention does so at an important difference consistently and across several measures.

The correlations that were calculated provide additional research information. The experimental group receiving the PA drills had consistent and moderately strong positive correlations among posttest subtest scores ranging from .40 to .59. This finding indicates that the treatment provides consistent improvement across all subtests for the students in this research. The correlations for the control group were, however, not as consistent or as strong. These correlations ranged from a low of .21 to a high of .62, indicating that those students not receiving the treatment could not be expected to do well across all of the measures used in this research.

A student who received PA drills could anticipate a total of 12 additional points on all subtests combined than had the same student not received the intervention. For a population of just 100 students, this increase represents 1,200 more correct responses with the intervention than in its absence. Furthermore, the intervention appeared to have contributed to providing students with improvement at a higher level of consistency throughout subtest scores (.40 contrasted with .21) without sacrificing improvement at the highest level of consistency between the two groups (.59 contrasted with .62).

Recommendation

The PRC has the world's largest education system. The 1986 Law on Compulsory Education requires that children receive nine years of formal schooling comprised of six years of primary education and three years of junior high education. As mandated by the State Education Ministry and commencing September 2001, English will become a nationwide required subject for all students in grade 3 and above by 2005. Prior to the mandate, most urban, public schools offered English as an elective to students in grades 5 and 6, two lessons per week, 40 minutes per lesson. According to the new curriculum

standard, 3 to 4 lessons will be offered per week, 40 minutes per lesson. As all students in the urban areas will soon be studying English in grades 3-9, large numbers will receive instruction.

Chinese teachers of English are currently trained to teach English in the communicative way, with attention attached to developing student interest and oral English. Those who teach English in grade levels 1-6 are required to have three years of study in English at the college level. As English is now so critically needed, many teachers lack adequate training both in English language proficiency and teaching methodology. Although not previously trained in PA, the two Chinese teachers in this study learned quickly the sounds in the intervention and taught the lessons well. Chinese teachers of English who lack PA could benefit from the drills to enhance their phonological awareness skills in English. Furthermore, as the drills are scripted, sequential, and cumulative, the intervention is straightforward to administer.

Explicit instruction in PA illustrates the structure of words and how words can be pulled apart, manipulated, and put back together. An awareness of this structure is a vital component of literacy development of children who are native English speakers. PA instruction for children who are learning to speak English as a second language provides an opportunity for those children to learn about word structures, which is a basic foundation of language. This study determined that young Chinese children, speakers of a tonal primary language, could be taught to segment, blend, and manipulate the phonemes in English words. This provides evidence that differs from previous findings that people who have learned to read in a script that is not graphophonemic have difficulty segmenting speech into phonemes (Mann, 1987; Read, Zhang, Nie, & Ding, 1987). In

addition, the children were successful in developing phonological awareness when the PA instruction focused on more than two types of phoneme manipulation. This counters the Center for the Improvement of Early Reading (2001) report that stated, "Phonemic awareness instruction is most effective when it focuses on only one or two types of phoneme manipulation, rather than several types" (p. 7). Anecdotal accounts from the teachers of both the experimental and control groups indicated that the children who received the PA instruction showed increases in their oral language use of English, as well. The children in the experimental group were using more vocabulary and combining more words together in creating novel sentences in English.

This research determined that Chinese students in grades 1 and 2 improved their English literacy achievement by an important and consistent amount. Further, the PA drills were found to be unbiased in its benefit for improving both male and female students' English language development. The educational benefit of this intervention is well supported by the findings of this research. Therefore, PA instruction that fosters phonological awareness and word reading of English is recommended. This intervention would contribute to the critical skills required for the learning of English, as mandated by the most populated country in the world. That many Chinese students have difficulty mastering English word spelling shows their inadequate knowledge of sounds and the link to spelling. PA instruction can help most students learn to spell (Center for the Improvement of Early Reading Achievement, 2001). In addition, the drills could be added to the resources to teach English in the PRC. Currently, a new series of English textbooks for primary, junior high, and senior high schools are being published. The

textbook content does not include PA instruction. The drills would provide linguistic activities the promote reading and spelling.

Implications for future research include investigating the effectiveness of PA drills not only on Chinese students in grades 3 and higher, but also on Chinese adults learning English. Research could also examine changes in vocabulary development and spelling as a result of PA instruction. PA can be taught, and for those who never mastered it, this intervention may provide the missing component to English literacy.

References

Adams, M. J. (1990). *Beginning to read: Thinking and learning about print.* Cambridge, MA: MIT Press.

Aidinis, A., & Nunes, T. (2001). The role of different levels of phonological awareness in the development of reading and spelling in Greek. *Reading and Writing: An Interdisciplinary Journal, 14,* 145-177.

Ball, E. W., & Blachman, B. A. (1991). Does phoneme segmentation training in kindergarten make a difference in early word recognition and developmental spelling? *Reading Research Quarterly, 26,* 49-66.

Beijing Languages Institute (1989). *Practical Chinese reader 1.* Beijing: Commercial Press.

Blachman, B. A. (1984). Relationship of rapid naming ability and language analysis skills to kindergarten and first-grade reading achievement. *Journal of Educational Psychology, 76,* 610-622.

Bradley, L., & Bryant, P. (1983). Categorizing sounds and learning to read—a causal connection. *Nature, 301,* 419-421.

Bradley, L., & Bryant, P. (1985). *Rhyme and reason in reading and spelling.* Ann Arbor, MI: University of Michigan Press.

Byrne, B., & Fielding-Barnsley, R. (1991). Evaluation of a program to teach phonemic awareness to young children. *Journal of Educational Psychology, 83,* 451-455.

Byrne, B., & Fielding-Barnsley, R. (1993). Evaluation of a program to teach phonemic awareness to young children: A 1-year follow-up. *Journal of Educational Psychology, 85,* 104-111.

Calfee, R. C., Lindamood, P. E., & Lindamood, C. H. (1973). Acoustic-phonetic skills and reading—Kindergarten through 12th grade. *Journal of Educational Psychology, 64,* 293-298.

Campbell, D. T., & Stanley, J. C. (1963). *Experimental and quasi-experimental designs for research.* Chicago: Rand McNally.

Cardoso-Martins, C. (1995). Sensitivity to rhymes, syllables, and phonemes in literacy acquisition in Portuguese. *Reading Research Quarterly, 30,* 808-828.

Carraher, T. N. (1987). Illiteracy in a literate society: Understanding reading failure in Brazil. In D. Wagner (Ed.), *The future of literacy in a changing world* (pp. 95-110). Oxford: Pergamon Press.

Carrilo, M. (1994). Development of phonological awareness and reading acquisition: A study in Spanish language. *Reading and Writing: An Interdisciplinary Journal, 6,* 279-298.

Cary, L., & Verhaeghe, A. (1994). Promoting phonemic analysis ability among kindergarteners: Effects of different training programs. *Reading and Writing: An Interdisciplinary Journal, 6,* 251-278.

Center for the Improvement of Early Reading Achievement. (2001). *Putting reading first: The research building blocks for teaching children to read.* Washington, DC: Partnership for Reading.

Cossu, G., Shankweiler, D., Liberman, I. S., Katz, L., & Tola, G. (1988). Awareness of phonological segments and reading ability in Italian children. *Applied Psycholinguistics, 9,* 1-16.

Cunningham, A. E. (1990). Explicit versus implicit instruction in phonemic awareness. *Journal of Experimental Child Psychology, 50*, 429-444.

Defior, S., & Tudela, P. (1994). Effect of phonological training on reading and writing acquisition. *Reading and Writing: An Interdisciplinary Journal, 6*, 299-320.

Ehri, L. C., Nunes, S. R., Willows, D. M., Schuster, B. V., Yaghoub-Zadeh, Z., & Shanahan, T. (2001). Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis. *Reading Research Quarterly*, 36, 250-287.

Gathercole, S. E., Willis, C. S., & Baddeley, A. D. (1991). Differentiating phonological memory and awareness of rhyme: Reading and vocabulary development in children. *British Journal of Psychology, 82*, 387-406.

Greene, J. F. (1997). *Sounds and letters for readers and spellers: Phonemic awareness drills for teachers and speech-language pathologists* Longmont, CO: Sopris West.

Hatcher, P. J., Hulme, C., & Ellis, A. W. (1994). Ameliorating early reading failure by integrating the teaching of reading and phonological skills: The phonological linkage hypothesis. *Child Development, 65*, 41-57.

Holm, A., & Dodd, B. (1996). The effect of first written language on the acquisition of English literacy. *Cognition, 59*,119-147.

Huang, H. S., & Hanley, J. R. (1997). A longitudinal study of phonological awareness, visual skills, and Chinese reading acquisition among first-graders in Taiwan. *International Journal of Behavioral Development, 20*, 249-268.

Juel, C. (1988). Learning to read and write: A longitudinal study of 54 children from first through fourth grades. *Journal of Educationd Psychology, 78,* 243-255.

Leather, C. V., & Henry, L. A. (1994). Working memory span and phonological awareness tasks as predictors of early reading ability. *Journal of Experimental Child Psychology, 58;* 88-111.

Liberman, I. Y., & Shankweiler, D. (1985). Phonology and the problems of learning to read and write. *Remedial Special Education, 6,* 8-17.

Liow, S. J. R, & Poon, K. K. L. (1998). Phonological awareness in multilingual Chinese children. *Applied Psycholinguistics, 19,* 339-362.

Lundberg, I. (1991). Phonemic awareness can be developed without reading instruction. In S. A. Brady & D. P. Shankweiler (Eds.), *Phonological processes in literacy* (pp. 47-53). Hillsdale, NJ: Erlbaum.

Lundberg, I., Frost, J., & Petersen, O. P. (1988). Effects of an extensive program for simulating phonological awareness in preschool children. *Reading Research Quarterly, 23,* 263-284.

Mann, V. (1987). Phonological awareness: The role of reading experience. In P. Bertelson (Ed.), *The onset of literacy: Cognitive processes in reading acquisition* (pp.65-92). Cambridge, MA: MIT Press.

McDougall, S., Hulme, C., Ellis, A., & Monk, A. (1994). Learning to read: The role of short-term memory and phonological skills. *Journal of Experimental Child Psychology, 58,* 112-133.

McNaughton, W. (1979). *Reading and writing Chinese.* Tokyo: Charles E. Tuttle.

Morais, J., Bertelson, P., Cary, L., & Alegria, J. (1987). Literacy training and speech segementation. In P. Bertelson (Ed.), *The onset of literacy: Cognitive processes in reading acquisition* (pp.45-64). Cambridge, MA: MIT Press.

National Reading Panel. (2000). *Report of the National Reading Panel: Reports of the subgroups.* Washington, DC: National Institute of Child Health and Human Development Clearinghouse.

Oktay, A., & Aktan, E. (2002). A cross-linguistic comparison of phonological awareness and word recognition in Turkish and English. *International Journal of Early Years Education, 10*(1), 37-48.

Porpodas, C. (1989). The phonological factor in reading and spelling of Greek. In P. G. Aaron & R. M. Joshi (Eds.), *Reading and writing disorders in different orthographic systems* (pp. 177-190). Dordrecht: Kluwer Academic Publishers.

Read, C., Zhang, Y., Nie, H., & Ding, B. (1987). The ability to manipulate speech sounds depends on knowing alphabetic writing. In P. Bertelson (Ed.), *The onset of literacy: Cognitive processes in reading acquisition* (pp. 31-44). Cambridge, MA: MIT Press.

Scarborough, H. S. (1998). Early identification of children at risk for reading disabilities: Phonological awareness and some other promising predictors. In B. K. Shapiro, P. J. Accardo, & A. J. Capute (Eds.), *Specific Reading Disability* (pp.75-120). Timonium, MD: York Press.

Snow, C. E., Burns, M. S., & Griffith, P. (Eds.). (1998). *Preventing reading difficulties in young children.* Washington, DC: National Academy Press.

Sodoro, J., Allinder, R. M., & Rankin-Erickson, J. L. (2002). Assessment of phonological awareness: Review of methods and tools. *Educational Psychology Review, 14*(3), 223-260.

Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (1999). Test of word reading efficiency. Austen, TX: Pro-ed.

Torgesen, J. K., Wagner, R. K., & Rashotte, C. A., Alexander, A. W., & Conway, T. (1997). Preventive and remedial interventions for children with severe reading disabilities. *Learning Disabilities: A Multidisciplinary Journal, 8*, 51-61.

Tzeng, O. J. L. (1981). Relevancy of experimental psychology to reading instruction. In O. J. L. Tzeng and H. Singer (Eds.), *Perception of print: Reading research in experimental psychology*. Hillsdale, NJ: Erlbaum.

Uhry, J. K. (1993). Predicting low reading from phonological awareness and classroom print: An early reading screening. *Educational Assessment, 1*, 349-368.

Uhry, J. K. (1999). Phonological and orthographic development in first and second graders' spellings. Paper presented at the annual meeting of the Society for the Scientific Study of Reading in Montreal.

Uhry, J. K., & Shepard, M. J. (1993). Segmentation/spelling instruction as part of a first grade reading program: Effects on several measures of reading. *Reading Research Quarterly, 28*, 218-233.

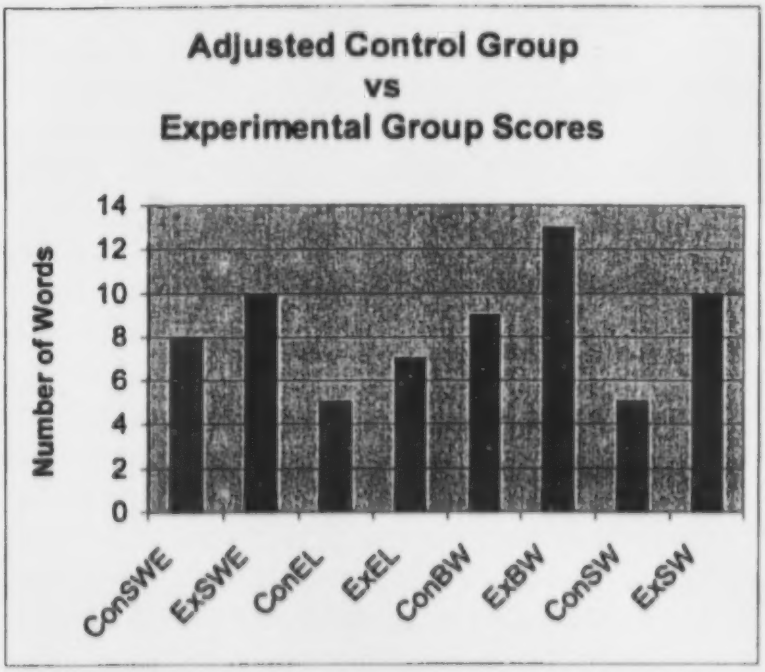
Wagner, R. K., & Torgesen, J. K. (1987). The nature of phonological processing and its causal role in the acquisition of reading skills. *Psychology Bulletin, 101*, 192-212.

Wagner, R. K., Torgesen, J. K., & Rashotte, C. A. (1999). Comprehensive test of phonological processing. Austen, TX: Pro-ed.

Wimmer, H., & Hummer, P. (1990). How German-speaking first graders read and spell: Doubts on the importance of the logographic stage. *Applied Psycholinguistics, 11,* 349-368.

Wimmer, H., Landerl, K., & Schneider, W. (1994). The role of rhyme awareness in learning to read a regular orthography. *British Journal of Developmental Psychology, 12,* 469-484.

Figure 1. Effects of phonemic awareness drills on sight word efficiency (SWE), elision (EL), blending words (BW), and segmenting words (SW): Adjusted control group (CON) vs. experimental (EX) group scores.


Adjusted Control Group
vs
Experimental Group Scores
Number of Words
14
12
10
8
6
4
2
0
ConSWE
ExSWE
ConEL
ExEL
ConBW
ExBW
ConSW
ExSW

CS 511 659

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

ERIC Educational Resources Information Center

REPRODUCTION RELEASE

(Specific Document)

I. DOCUMENT IDENTIFICATION:

Title: The Effects of Phonemic Awareness Drills on Phonological Awareness and Word Reading in a Later Learned Alphabetic Script	
Author(s): Ashmore, Rhea A.; Chu, Xianhua; Farrier, Merle J.; Paulson, Lucy H.	
Corporate Source:	Publication Date: October 10, 2002

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, *Resources in Education* (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic media, and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following three options and sign at the bottom of the page.

The sample sticker shown below will be affixed to all Level 1 documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

Level 1

☑

Check here for Level 1 release, permitting reproduction and dissemination in microfiche or other ERIC archival media (e.g., electronic) and paper copy.

The sample sticker shown below will be affixed to all Level 2A documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2A

Level 2A

☐

Check here for Level 2A release, permitting reproduction and dissemination in microfiche and in electronic media for ERIC archival collection subscribers only

The sample sticker shown below will be affixed to all Level 2B documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2B

Level 2B

☐

Check here for Level 2B release, permitting reproduction and dissemination in microfiche only

Documents will be processed as indicated provided reproduction quality permits.
If permission to reproduce is granted, but no box is checked, documents will be processed at Level 1.

I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche or electronic media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries.

Sign here, please

Signature: Rhea A. Ashmore	Printed Name/Position/Title: RHEA A. ASHMORE, Professor
Organization/Address: The U. of Montana - Missoula School of Education, 32 Campus Drive Missoula MT 59812	Telephone: 406.243.5415 FAX: 406.243.4908
	E-Mail Address: rheanne@bigsky.net (rheann) Date: 10/10/02

(Over)

III. DOCUMENT AVAILABILITY INFORMATION (FROM NON-ERIC SOURCE):

If permission to reproduce is not granted to ERIC, *or*, if you wish ERIC to cite the availability of the document from another source, please provide the following information regarding the availability of the document. (ERIC will not announce a document unless it is publicly available, and a dependable source can be specified. Contributors should also be aware that ERIC selection criteria are significantly more stringent for documents that cannot be made available through EDRS.)

Publisher/Distributor:
Address:
Price:

IV. REFERRAL OF ERIC TO COPYRIGHT/REPRODUCTION RIGHTS HOLDER:

If the right to grant this reproduction release is held by someone other than the addressee, please provide the appropriate name and address:

Name:
Address:

V. WHERE TO SEND THIS FORM:

Send this form to the following ERIC Clearinghouse:

ERIC CLEARINGHOUSE ON ASSESSMENT AND EVALUATION
UNIVERSITY OF MARYLAND
1129 SHRIVER LAB
COLLEGE PARK, MD 20742-5701
ATTN: ACQUISITIONS

However, if solicited by the ERIC Facility, or if making an unsolicited contribution to ERIC, return this form (and the document being contributed) to:

ERIC Processing and Reference Facility
4483-A Forbes Boulevard
Lanham, Maryland 20706

Telephone: 301-552-4200
Toll Free: 800-799-3742
FAX: 301-552-4700
e-mail: info@ericfac.piccard.csc.com
WWW: http://ericfacility.org

EFF-088 (Rev. 2/2001)